

PRE-COURSE WORK ASSIGNMENT

COURSE:	Fire Program Management, M-581
LESSON:	A - Business Management
UNIT:	3 - Program Management
SUGGESTED TIME:	1 hour
EQUIPMENT:	None
MATERIALS:	None
OBJECTIVES:	Upon completion of the pre-course work, participants will be able to recognize considerations necessary to manage fire program responsibilities in the areas of facilities, property, and equipment.

ACTIVITY

Reading

A. INTRODUCTION

The Fire Program Manager has the responsibility to ensure that Property, Facilities, and Equipment are maintained for the safety of the employees and public. They should be in a safe, clean and structurally sound condition. There is a large investment in these items.

B. ASSIGNMENT

The following outline on property is divided into three parts: Property Management, Facilities and Equipment. Read the outline and be ready to discuss in class.

I. PROPERTY MANAGEMENT

All Federal property requires some level of control and management. Some items, at a level set by owning federal agency, require a formal inventory process. Items with an original acquisition cost below this level, and consumable or expendable items, require less stringent controls but must still be managed

Formally inventoried items commonly cost \$5,000 or more and are expected to last more than a year, or have been determined by an agency Property Management Officer (PMO) to be sensitive, that is, subject to fraud, waste, or abuse.

Non-inventoried property comprises a significant part of the fire program. Items such as hose, fittings, packs, canteens, hard hats, gloves and many other small items need not be formally inventoried, but should be protected from unauthorized or personal use and

issued under a system which will allow identification of excessive losses. Where suitable, these items should be marked as federal property. They may be interchanged with like items belonging to cooperating agencies. At the end of the fire season, a property manager should be able to identify where these expendable, consumable items were issued to allow replacement by the appropriate agency or account.

The greatest property losses to fire programs are in this category. Within federal agencies, it is appropriate to replace equipment destroyed or lost on a fire with funds for that fire. State agencies may have different policies.

A. Inventory process.

The formal inventory process is described by your agency policy. The Federal process commonly describes accountable property as having an original acquisition cost of \$5000 or more, or as sensitive (as determined by a Property Management Officer). Sensitive items may include such fire program items as chain saws, pumps, cameras, and other items subject to fraud, waste, or abuse. All inventoried property is given a unique inventory control number and should be marked as federal property.

A physical (touch) inventory is done at least biannually to account for this property. This inventory is certified to the Property Management Officer that all items included on it are in your possession or you have documents to account for any differences. All transfers and disposals of accountable property shall be documented.

B. Control of non-inventoried property.

Sufficient control shall be maintained over non-inventoried property (consumables/expendable items) to insure reasonable protection from waste and abuse, and to provide adequate records for replacement by the appropriate agency or account.

C. Excess and Surplus Property

1. Excess: Property no longer needed by the owning agency is excess. Excess property suitable for conversion to fire program use from all federal agencies and from the Department of Defense is made available for state and local fire department use through the State Forester and the US Forest Service, the only federal agency authorized to do this. Local fire departments must have a direct, contract, or mutual aid responsibility to be eligible. Only property that can be used in direct fire suppression may be loaned to a local fire department. Title to the property remains with the US Forest Service; the program is managed for the state by the State Forester. This program is commonly referred to as the Federal Excess Personal Property Program (FEPP).
2. Surplus: Excess equipment not needed by any federal agency (including any State Forester for the fire program) is determined by GSA to be surplus. The State Agency for Surplus Property (SASP) may acquire title to this property and provide it to state agencies for a percentage of the original acquisition cost. The percentage varies from state to state but is usually about 10%. This procedure applies to all surplus property, not just fire equipment.
3. All surplus property not acquired for donation may go to sale to the general public.

4. When the cost of handling excess property is likely to exceed the value of the property or the expected return from its sale, as determined by the Property Management Officer, the PMO may elect to donate the property to the SASP or to another state agency, or to abandon it in place. This would most commonly happen with items in scrap or salvage condition, although it is not restricted to these conditions.
5. Federal Excess Personal Property (FEPP) is property acquired from excess that is loaned to the State Foresters by the US Forest Service for the fire program. This gives the states the ability to screen and acquire excess property at a higher level than would be possible were the property to go to donation. They are actually screening property as the USFS.

USDI agencies can report fire equipment as excess and it can be transferred to the Forest Service for loan to state forestry organizations under the FEPP program.

The FEPP program and procedures are described in the Federal Excess Personal Property Desk Guide (March 1996). Policy is contained in the Code of Federal Regulations in Chapter 101, the USDA Property Management Regulations, Forest Service Property Acquisition Assistance Handbook (PSH 3109.12), Forest Service Manual 6410, and the Forest Service Property Management Regulations (PSH 6409.31).

6. Highlights of the program
 - a. All federal excess personal property is loaned by the federal government.
 - b. Title stays with the Forest Service and equipment must be returned after the state has no further use for the equipment.
 - c. FEPP equipment must be accounted for from acquisition until it is returned or the property is properly disposed of.
 - d. FEPP is maintained on federal and state property inventories.
 - e. The state must have a cooperative agreement with a RFD and the RFD must meet certain eligibility requirements to use FEPP.
 - f. The state is responsible to administer the FEPP program, the Forest Service will provide direction, oversight, periodic inventory, and is responsible for disposal when the state no longer has a need for the item(s).
 - g. RFDs cannot acquire FEPP without prior approval of the state.
7. Items to be loaned will normally be limited to the following:
 - a. Trucks
 - b. Tanks, water or fuel

- c. Fire tools
 - d. Winches
 - e. Nozzles
 - f. Pumps
 - g. Air compressors
 - h. Generators
 - i. Tactical communications systems
 - j. Trailers
 - k. Fire protective clothing
 - l. Vehicle parts and sirens
 - m. Material to fabricate and maintain these items
 - n. Breathing apparatus
 - o. Forcible entry tools
 - p. Extraction equipment
8. Items unacceptable for acquisition:
- a. Hazardous materials
 - b. Recreational/athletic equipment
 - c. Non-fire protective clothing
 - d. Office machines
 - e. Cameras
 - f. Paint
 - g. Appliances
 - h. Firearms
 - i. Sedans

D. Overview of State Surplus

States generally have programs where they dispose of state owned property very similar to the federal property systems.

E. Property Disposal Processes

Federal property in good condition that is no longer needed by the local unit can be declared to the local Property Management Officer (PMO) as excess to their needs.

The PMO can notify other units of the agency that the equipment is available. If no other units need the equipment, the PMO will notify the General Services Administration of the excess property.

GSA will then notify other agencies of the equipment. The states have access to this notice and can screen, and put a "hold" on the equipment for FEPP purposes only.

If the equipment has been listed for 60 days and no agency or state has requested that equipment for FEPP, the property is listed as Surplus and states and other designated agencies and organizations can request the property.

If the property has still not been taken. It is put up for sale by GSA. This is then available to the general public.

II. FACILITIES

A key consideration to managing facilities is to familiarize yourself with OSHA 29 CFR 1910.

A. Fire Program Facilities - Types of facilities normally associated with the fire program include but are not limited to the following:

1. Warehouse
2. Engine storage
3. Flammable materials
4. Lookouts
5. Guard stations/remote stations
6. Helibases
7. Air tanker bases
8. Weather stations
9. Dispatch centers

B. General

Installation and maintenance of all buildings, electrical, water, sewer and heating must be done according to state and local codes. Buildings must be maintained, kept in good condition and clean (29 CFR Subpart J, 1910.141)

C. Warehouses

1. Access and loading areas for ease of handling of equipment are needed.
2. Overhead storage and posted load rating capacity is required.
3. Strength of shelving is a consideration. Make sure all local building codes are followed.
4. Rodent proofing areas to protect equipment and supplies from animal damage is a must.
5. Security is important.

D. Engine Storage

1. Protect engines from sun, rain and snow as much as possible. By doing this you:
 - a. Extend engine life.
 - b. Reduce vehicle maintenance costs.
 - c. Reduce overall vehicle use costs.
2. Providing heated areas:
 - a. Protects against winter freeze damage.
 - b. Provides faster starts during cold weather and reduces engine wear.
3. Compressed air for air brakes.
 - a. Provides air to vehicle air brake system.
 - b. Reduces response time, eliminates need to build air pressure during warm up.
4. Electricity made available provides:
 - a. Lighting.
 - b. Engine block heater accessibility.
 - c. Power tool use availability.
5. Security
Provides protection from theft and vandalism.

E. Flammable Materials Storage

1. Separate these facilities from general warehouse.
 - a. Do not store flammable materials in general warehouse area.
 - b. Do not store flammable materials in any living areas.
2. Provide explosion proof heat and lighting.

Examples of unacceptable conditions include exposed light bulbs without fully covered glass and metal protective covers, conventional light switches.

Adequate ventilation to dissipate flammable vapors.

3. Drip catchment
 - a. Provide drip containment under fuel and oil drums.
 - b. Provide material for cleanup of spills such as sand, sawdust, absorbent materials.

F. Fuel Storage

1. Requirements vary with amount of fuel being stored and whether the tanks are above or below ground.
2. Less than 660 gallons single container above ground does not require a containment system.
3. More than 1320 gallons above ground storage in multiple containers requires a containment system that will contain the contents if the tanks rupture.
4. Below ground tanks require special monitoring systems to check for leakage.

G. Lookouts

Lookouts have some very special considerations because they are both living quarters and a worksite.

1. Structural integrity
 - a. Annual inspections need to be made of all towers, wood or steel.
 - b. Inspections should be made by a qualified structural engineer.
2. Lightning protection
 - a. Ground lines should be checked annually and after each lightning storm.

- b. Ground lines should be single piece from the top of the lookout to end of the ground line. Sometimes pieces are spliced in when the line is damaged. This is not acceptable as it sets up resistance in the line.
 - c. All appliances and fixtures in the lookout need to be grounded.
 - (1) Radio/Antennas
 - (2) Fire finder
 - (3) Stove
 - (4) Refrigerator
 - (5) Propane systems
- 3. Heating
 - a. Since this is a worksite and living quarters, appropriate heating needs to be provided.
 - b. Propane and/or natural gas systems need to be checked annually prior to use. CO2 detector should be installed.
- 4. Lighting

Since this is a worksite and living quarters, appropriate lighting needs to be provided.
- 5. Sleeping areas

Smoke alarms are required in all sleeping areas.
- 6. First aid facilities and equipment

First aid supplies are required to be provided at worksites and living quarters.
- 7. Cooking

In remote location living quarters, adequate cooking facilities need to be provided.
- 8. Food storage

Adequate food storage is to be provided to keep food from spoiling.
- 9. Potable water
 - a. Safe drinking water must be provided.
 - b. Water used for drinking, washing, cooking, bathing must be potable.
 - c. Minimum amount to be provided is 35 gallons per day.

- d. Containers/canteens cannot be shared.

10. Sanitation

- a. Showers must be provided with hot and cold water, or provisions for a shower every three days.
- b. Toilets must be fly and rodent proof, and equipped with a method to control the odor.
- c. Garbage must be emptied at least twice a week.
- d. Insect/rodent protection must be provided for all facilities.

11. Firefinder

- a. The Firefinder must be checked for correct orientation.
- b. The Firefinder requires periodic maintenance, such as cleaning and oiling metal parts and replacement of the cross hairs (horse hair).

12. Security

Make sure the facility is secured from theft, vandalism and provide protection from injury.

13. Safety concerns

- a. Railing height and rail spacing are a concern.
- b. Stairways and hand railing.
- c. Public access.
- d. Public and employee safety.

H. Guard Stations/Remote Stations

Requirements for remote stations vary with the number of employees stationed at the site; the requirements generally break at less than five employees, more than five, and another break at more than 15 employees.

1. Heating

Since this is a worksite and living quarters, appropriate heating needs to be provided. Propane and/or natural gas systems should be checked annually and CO2 detector installed.

2. Lighting

Since this is a worksite and living quarters, appropriate lighting needs to be provided.

3. Sleeping

Smoke alarms are required in all sleeping areas. See #1 for propane and/or natural gas.

4. First aid

First aid supplies are required to be provided at worksites and living quarters.

5. Cooking

- a. In remote locations, adequate cooking facilities need to be provided.
- b. Cooking areas must be separated from living quarters in certain cases.
- c. Cooking and sleeping areas must be at least 500 feet from any livestock area.

6. Food storage

Adequate food storage is to be provided to keep food from spoiling.

7. Potable water

- a. Safe drinking water must be provided.
- b. Water used for drinking, washing, cooking, bathing must be potable.
- c. Minimum amount to be provided is 35 gallons per day.
- d. Containers/canteens cannot be shared.

8. Sanitation

- a. Showers must be provided with hot and cold water, or provisions for a shower every three days.
- b. One showerhead for every 10 employees of each sex.
- c. Each sex must have separate showers.
- d. Toilets must be fly and rodent proof, and equipped
- e. Separate toilets must be provided for each sex.
- f. Garbage must be emptied at least twice a week.
- g. Insect/rodent protection must be provided for all facilities.

9. Security

Make sure the facility is secure from theft, vandalism and injury liability.

10. Right-to-Know Information: Right-to-Know information must be provided at all worksites. This includes the Material Safety

Data Sheets (MSDS) and amount and kind of hazardous material stored at the location.

I. Helibases

1. Landing area consideration

- a. Surface should be clean, dust controlled and smooth; it is preferable to have a concrete landing surface. Asphalt has a tendency to break up in hot weather when helicopter skids push out the material.
- b. Clearance around the landing pads should be a minimum of 75 feet.
- c. The number of landing pads at the helibase should be considered, have at least one extra.
- d. Landing pattern clearance should follow the guideline in the IHOG.
- e. Marking should be in accordance with IHOG.
- f. Lighting is not required, but if you have the opportunity, do it.
- g. FAA needs to be consulted when developing or changing permanent helibases.

2. Pilot lounge

- a. An area needs to be provided for the pilot to rest during the day.
- b. It should be quiet.
- c. The pilot should have a place for the pilot to lie down.
- d. Provide both heat and air conditioning.
- e. Pilots need to have access to a telephone.
- f. Pilots need to have a desk or similar area to work.

3. Crew area

An area for the Helitack crew to assemble their equipment.

4. Sanitation facilities

- a. The requirements for providing sanitary facilities will depend on where the helibase is located. If it is a remote station, then all the standards for remote stations would apply.
 - b. Showers should be provided.
 - c. Toilets should be provided; the number would be determined by the number of employees at the helibase on a regular basis.
 - d. Potable water is to be provided.
5. Storage
- a. Storage facilities should be provided for all equipment.
 - b. The facility should be rodent proof.
6. Supply fuel storage/spill containment
- The standards for fuel storage and spill containment are the same.
7. Communications
- a. Considerations should be given to the type of communications that you should have at the helibase.
 - b. Radio communications should be considered for both the local agency frequencies and VHF communications with aircraft.
 - c. Telephone communications should be considered for agency communications and for pilot business.
 - d. If possible, a fax should be made available.
8. Perimeter security/fencing
- a. The perimeter of the helibase should be fenced to provide security for the helicopter.
 - b. A barrier should be provided around the landing area to keep unauthorized personnel from approaching the helicopters.
- J. Air Tanker Bases
- 1. Ramp should be rated to carry the heavy air tankers and provide space for a minimum of three air tankers.
 - 2. Loading equipment needs to be standardized.
 - 3. Bulk storage area needs to be provided.

4. Holding tanks for mixed retardant.
5. Spill containment needs to be provided for retardant on the ramp and a method to collect it.
6. Mixing equipment should be standardized.
7. Pilot ready room should be provided where the pilot can rest and conduct business. Smoke detectors and CO2 detector should be installed as needed.
8. Aircraft parking away from the loading ramp should be provided for aircraft not on duty.
9. Runway length is a major consideration when planning an air tanker base.
10. Runway capacity is the second most important consideration. This is what the runway is capable of carrying as far as weight.
11. Communications (refer to I7)

K. Weather Stations

1. Location
 - a. Optimum Fire Danger Rating location is mid-slope, southwest exposure.
 - b. Away from watered lawns or fields.
 - c. Away from large paved areas, parking lots.
 - d. Open area exposed to wind.
2. Maintenance.
 - a. Area around station free from weeds.
 - b. Instruments, Manual, RAWS.
3. Security.

Protect from vandalism or theft.

L. Maintenance Scheduling and Budget Processes

Agency policies concerning maintenance and budgeting processes vary between agencies, but the concepts provided here should follow with most.

Maintenance is important in reducing overall costs of operating facilities. A good program will consider the long-term needs of the facility rather than just look at the problems as they arise. Preventative maintenance is a key process.

1. Annual inspections - Inspecting facilities on an annual basis will identify maintenance problems before they become major.
2. Priority setting - With limited budgets sometimes priority setting is necessary. The following concept will help in setting those priorities:
 - a. Health and Safety - those items that contribute directly to the health and safety of the employees and public. These should be the top priority.
 - b. Meeting law or policy should be the next priority. Some things within the area can be postponed until scheduled remodeling is planned, others cannot. Generally, they fall into two categories: Americans with Disabilities Act (ADA) and Occupational Safety and Health Act (OSHA). With ADA some of the requirements can wait until a planned activity takes place and the upgrading of the facilities can take place. With any new construction, they must be met. OSHA requirements also differ with the type of requirement. Generally, these must be met immediately. Immediately may mean today before any work can continue to, you have 30-60 days to accomplish the corrective action.
 - c. Prevention of further significant deterioration is an important factor. This concept looks at the long-term effects of not doing the maintenance and determining what the priority is.
 - d. General upkeep is the last category. This takes into account the appearance of the facility and sets the priority based on the need to provide a well-looking facility.

3. Budgeting for Facilities

a. Maintenance

Budgeting processes tend to be agency specific. Your process should include some basic principles that integrate priority into the allocation of the funds for maintenance.

Federal budgets deal with an outyear budgeting process where estimated needs are used to develop a budget for three years out. This estimate needs to take into consideration your long-term needs based on your inspections. This means you need to develop a long-term facilities management plan that will cover programmed work and also take care of any emergencies that might arise.

Current year budgets may or may not cover all your projected needs. Your priority process will help you determine what you will fund during that current year. Your planning process needs the flexibility to respond to emergency situations. Yet with good priorities and process you will make the best use of the funds.

b. Capital investment project

Capital investment projects are usually projects over \$100,000 in size. This definition and amount are determined by the agency. These usually have a

separate process to follow. They are more long-term and will take more in-depth analysis to give you the alternatives.

They are usually submitted annually. The priorities are usually compared on a larger scale. This could be on a state or regional level. When a project is accepted and a priority assigned, it usually takes three to five years to have a project completed if it has a high priority.

NFMAS/Fire Protection Analysis needs is a justification for receiving a higher priority. The identification of facilities needs in the NFMAS process is very important.

III. EQUIPMENT

This section deals with the equipment most commonly used in the fire program. It will cover the considerations for determining the type and amount of equipment needed in a given area.

The following describes maintenance and storage considerations for fire program equipment, description of the geographic area, regional, state and local cache systems, and considerations for stocking your local cache.

A. Type and amount of equipment.

Determining the type and amount of equipment for a unit is important to effectiveness and cost efficiency of the protection resources.

The following are guides to assist in determining the type and amount of equipment.

1. Interagency Initial Attack Analysis (IIAA) - presents an efficient mix of resources.
2. Fire Protection Analysis - describes areas of particular concern.
3. Land Allocations - may differentiate appropriate suppression strategies.
 - a. Wilderness vs. non-wilderness - wilderness may limit the kind and amount of mechanized equipment that may be used. On the other end of the spectrum, a full suppression strategy may be appropriate to protect high dollar value resources.
4. Fuel types and topography will guide the types of equipment that are effective.
5. OSHA standards - require certain types of equipment, i.e.:
 - a. Personal protective equipment
 - b. Sanitation
 - c. Potable water

- d. First aid equipment
- e. Communications

B. Examples of equipment

1. Engines

- a. Access, fuel type, topography, management allocations, resource values assist in determining the number and size of engines for a unit.
- b.. Light fuel, sandy rough ground might lead the manager to consider an engine of lesser water capacity and with four-wheel drive.
- c. Another example would be urban interface, where the manager would want an engine with a higher capacity pump, at least 500 gallons of water, ability to connect to a hydrant and self-contained breathing apparatus.
- d. Fuel availability - gas versus diesel.

2. Prevention units

Prevention workload analysis, fuel type, and initial attack responsibility would assist in determining the type of equipment needed.

3. Hand tools

- a. Fuel type is the main consideration in determining the type of hand tools needed. Normally, shovels and pulaskis are a good choice.
- b. Other tools such as Mcleods and grub hoes work well where scraping and digging is the main line construction method.
- c. Brush hooks are effective with light to moderate brush.
- d. Swatters are effective in light grass fuels.
- e. There are numerous other specialized tools. The choice needs to consider cost effectiveness and amount of use that the tool would have in the area.
- f. A good rule is to keep the number and type of tools to a minimum.

4. Chainsaws

- a. First consideration is size of material to be cut. If the saw is to be used only to cut large trees, then the consideration should be given to power and length of the bar. If it is to be used to clear material for line construction, the consideration should be given to weight, ease of operation and operator fatigue.
- b. Bowbars could be considered if the work is in brush fuel types.

- c. Personal protective equipment and training.

5. Pumps

- a. Consideration should be given to the amount of water needed to be moved and second, to where it needs to be moved.
- b. Pumps are usually rated for either volume or pressure. A pressure pump is generally needed to deliver water to a hoselay.
- c. A volume pump is used to fill another water source such as an engine, water tender, or a portable tank. The selection of a volume pump is straightforward. Select a volume pump that will fill the engine, water tender, or tank in less than 10 minutes.
- d. A pressure pump selection is a little more complicated. The selection should be based on the amount of pressure needed to supply the normal hoselay. In flat country, it will take less pressure. In steep country where there is a need to pump up a great distance, then the pressure requirements would be different. In this case the combination of pump capability, hose, fittings and nozzles would play into the decision process.

6. Firing equipment

Selection of firing equipment should consider the fuel types, ease of maintenance, availability of fuel or ignition devices, safety and security. Type of devices to consider would be fusees, drip torches, propane burners, flare guns and gelled fuel.

7. Canteens

Special safety consideration should be given to the selection of canteen types. Canteens should not be used by more than one person. Disposable canteens are a preferred type. If you choose a reusable canteen, they must go through a rigid sanitation process.

C. Communications Equipment

Communications are critical to manage a fire program for efficiency and safety. Fire managers need a basic understanding of radio capabilities.

1. Radio Systems

Radio systems generally have three parts: hand held portable radios, mobile vehicle radios and the backbone system that brings it all together.

- a. Hand held
- b. Mobile
- c. Backbone system common components:

- (1) Repeaters - repeat a radio transmission signal so a larger area can receive the signal.
- (2) Links - link radio transmission signals to the base stations.
 - (a) Microwave - used as a linking system.
 - (b) Hardwired - phone lines used for linking.
- (3) Base stations - base stations are fixed radio transmission facilities, may control repeaters and receive a large variety of frequencies.

2. Pagers

Method to maintain contact, smaller and easier to carry than a radio, more suited to urban areas.

3. Cellular phones

Where service is available, an excellent tool for fire managers, also as coverage increases this is a good tool for lookouts.

4. Radio telephones

Uses a radio link to a phone system; this service is used more in remote areas not served by cellular services. Consider this for remote stations and lookouts.

5. FAX

Has the capability to transmit documents over telephone lines where possible; excellent at guard stations, lookouts, air tanker bases, etc.

6. Computers

Computers have the capability to ease the workload in many areas. In the fire management program there are many applications: electronic mail, fire modeling, budgeting tools, analysis processes. Excellent tool in today's fire management programs. Consideration should be given to providing computer access to dispatch facilities and expanded dispatch locations.

- a. PC - used for office applications.
- b. Laptop - can be used for field applications, fire modeling, fire behavior, fire suppression resource tracking and planning, fire suppression inventory processes, GIS information for fire suppression and numerous other applications.

7. Telephones

Consideration should be given to the number and type of lines available in dispatch offices and expanded dispatch facilities. Regular communications, emergency lines,

hot lines, and availability of additional circuits or lines from the phone company if the need arises.

D. Fire Suppression Equipment

1. Maintenance

Maintenance of fire suppression equipment is an important issue. Guidelines are available for maintaining the equipment. Standards are available in the NWCG Fire Equipment Working Team publication on maintaining cache equipment and standards, and the NWCG Firefighters Guide.

Maintenance standards for canteens are a special area that needs to be adhered to. 29 CFR 1910.141 mandates that a common drink utensil is prohibited. Non-disposable canteens must be sanitized before they can be reissued. With most federal agencies, the maintenance of equipment used for fire suppression can be charged to the incident. Check the specific agency policy.

2. Storage considerations

a. Hazardous materials

Certain materials that are considered hazardous or flammable must be stored separate from other warehouse supplies and living quarters. The two most common are fuels and fusees and need to be stored in a separate flammable storage locker or storage building depending on the amount. Any more than 25 gallons must be stored in a separate building. Fusees must be stored in the original container, a wooden box with a lid, or a plastic container.

b. Pumps

Pumps should be “winterized” when used during cold weather. This includes draining the water from the pump heads and any gauges. For long-term storage, the pump engines should have a small amount of oil put in the top of the cylinder head and turned over to coat the inside of the cylinder with oil to prevent corrosion.

c. Chainsaws

Chainsaws should be thoroughly cleaned, drained of gas and oil, and oil put into the cylinder head for long-term storage.

d. Hand tools

Hand tools should be cleaned, sharpened and oiled before storage.

e. Rations

Rations need to be kept in a temperature-controlled environment for long-term storage. Rations should be kept from freezing temperatures or extreme heat.

Check the dates and pull the rations that exceed the expiration date and destroy them.

f. Engines

It is very important to properly winterize an engine. A properly designed engine and plumbing system will allow for easy winterization. All water needs to be drained from the pump, plumbing and gauges. If the engine is not equipped with valves or plugs to drain the water, the plumbing must be disconnected. Failure to drain all the water can be a costly mistake.

If the engine is stored in a humid area, the compartment and inside of the cab need to have adequate ventilation to prevent the buildup of condensation and molds.

Depending on the need, consider removing all the equipment from the engine during the off-season. This will allow for maintaining and storing hand tools, rations and hose properly, and allow for a thorough cleaning of the engine compartments.

3. Engines

a. Types

Types refer to a standard for capability and capacity of an engine. The reference for type designations is found in the Fireline Handbook Appendix page A-28. Models refer to an agency specific standard configuration for an engine.

b. Stocking

To determine the equipment to be carried on an engine, use the same considerations such as fuels and topography, compatibility with cooperating agencies and water capacity of the engine. Remember to not overload the vehicle. Careful planning and consideration needs to be given to what is carried.

- (1) Hose - minimum amounts would be guided by the engine typing requirements in the Fireline Handbook. A wildland engine should carry a complement of hose that is matched to the water capacity. Consideration should be given for the most efficient means of deploying the hose. The determination will guide whether hose is carried rolled, in quick lays or hose packs.
- (2) Appliances and fittings - consideration should be given to the amount of fittings and appliances carried on the engine. Only the minimum amount should be carried and only those things that are normally used.
- (3) Hand tools - consideration should be given to the number of people who will be supplied tools from the engine.
- (4) Chainsaw - consideration should be given to match the fuel types in the area.

- (5) Portable pump - consideration should be given to the use of the portable pump. Will it be used to refill the engine or is it used for pumping into a hose lay? This will lead to a decision on the need for a pressure or volume pump.
- (6) First aid - number of employees will determine the size necessary for the engine. Consideration should be given if the engine responds to medical incidents.
- (7) Drinking water - must be supplied for the crew at a minimum of two gallons per person.
- (8) Specialized equipment - consideration should be given to the following specialized equipment:
 - (a) Foam
 - (b) Self-contained breathing apparatus
- (9) Extra fuel - consideration should be given to carrying extra fuel for the vehicle, chainsaw, portable pump, auxiliary pump or drip torch if carried.

E. Equipment and Development Centers

Federal and state equipment and development centers are located throughout the country. One of their missions is to provide support to the fire management program. One component of that is the development of fire equipment. The most well known federal centers are Missoula, San Dimas and Boise. They publish information concerning a wide variety of issues concerning the fire program.

F. Fleet Equipment

This topic discusses fleet management principles such as maintenance, care and operating rates.

1. Maintenance schedules and Inspections

- a. Annual maintenance - These are done as a preventative maintenance check.
- b. Monthly preventative - Monthly check is done by the vehicle operator to ensure that the vehicle is safe to operate and to spot any developing problems.
- c. Weekly engine check - Some agencies have a guide that the fire engines are given the vehicle check on a weekly basis. It covers all the items in the monthly check and includes items specific to engines, such as checking the condition of the pump, tank, plumbing and equipment.
- d. Daily engine check - Some units have a daily checklist to make sure that the engine is ready to respond. This is usually done first thing in the morning. There are many examples of these and you need a system on your unit.

- e. General care of the engine is important. It represents the agency to the public and should be clean and well maintained. An engine is one of the most expensive pieces of fire fighting equipment. At last count more money was spent on engines than all the air tankers and helicopters combined. Engines should be stored out of the elements-- sun, heat, rain and snow.

2. FOR (Fixed Operating Rate)

In state organizations, this may be called a “revolving” fund. An estimate of the future cost of the vehicle is made by estimating the future sale value and subtracting from the future cost. The service life of the vehicle is estimated and divided into the future cost minus the sale value. This will lead to an annual cost for the vehicle. That cost is directly related to how long the vehicle is used and how it is maintained. This cost is usually calculated on a pool of vehicles of the same class.

3. Mileage rates or use rates

Mileage rates include:

- a. Fuel
- b. Oil
- c. Tires
- d. Repairs
- e. Preventative maintenance

This cost can be directly affected by the care the vehicle has received. It is calculated by adding the associated annual costs and dividing it by the annual average number of miles driven which gives a per mile rate. This cost is usually calculated on a pool of vehicles of the same class.

G. Cache Management

Caches are located at the geographic, staff and local levels. The following is a summary of caches:

1. Geographic Area Cache System

List of Geographic Area Cache locations:

- a. Boise, Idaho
- b. South Zone California, Arcadia, California
- c. North Zone California, Redding, California
- d. Redmond Fire Center, Redmond, Oregon

Satellites at La Grande, Oregon, and Wenatchee, Washington

- e. Missoula Aerial Fire Depot, Missoula, Montana
- f. London, Kentucky
- g. Prescott, Arizona
- h. Silver City, New Mexico
- i. Fairbanks, Alaska
- j. Grand Rapids, MI
- k. Grand Junction, CO
- l. Denver, CO

Mission of Geographic Area Cache System is to support the national emergency management needs, which includes fire and all other natural and human-caused emergencies.

Cache vans are a part of the Geographic Area Cache System. Equipment is loaded into vans and pre-positioned at designated locations, thus providing a quick first response to an emergency in a given location.

2. State Cache Systems

Most states that have wildland fire problems will have a cache system. These are further supported through agreements by the Geographic Area Cache System.

3. Local Cache Systems

Mission of the local cache is to provide equipment for extended attack response.

Considerations for stocking include:

- a. Determined by distance from geographic area or regional cache
- b. Fuel types
- c. Projected extended attack fire sizes

4. District, Area or Park Cache

Mission of the cache is to provide replacement equipment for initial attack resources.

Considerations for stocking include:

- a. Items that need to be refurbished before they can be used again.

b. Hand tools

c. Hose

H. Recycling

National Policy letter

IV. REFERENCES

OSHA 29 CFR 1910
NWCG Fireline Handbook
NWCG Firefighters Handbook
NWCG Water Handling Equipment Guide
Federal Excess Personal Property Desk Guide
NWCG Interagency Helicopter Operations Guide